

**NO.** 2161816  
**SHEET** 0  
**OF** 31

# DIAGNOSTIC TEST

**TITLE** WRITE ADDRESSES ON DISK PACK - DT 0020  
**LACH. TYPE** 1311 **BY** GIF **APPR.** CSF **DATE** 3-8-63

# ENGINEERING CHANGE HISTORY

AC NO.	494860						
DATE	3-14-63						

1311 DIAGNOSTIC TEST 0020

Write Addresses on Disk Pack

**A. SCOPE:**

This program writes indelible addresses on 1311 Disk Packs. The addresses are five digits in length and are written sequentially starting with the track specified by the address which is entered via the console typewriter. The test terminates when the last track of the specified disk storage module has been written. Addresses can be written on additional disk storage modules by repeating the test and entering a new five digit starting address.

This test can be used to write addresses on the CE Disk Pack. Addresses will be written on all cylinders except 00, 34, 35, 36, and 99.

The program provides the option of saving the data on each sector or generating data for each sector when writing the sector addresses.

**B. SETUP:**

1. While running the test, the program switches have the following functions:

Switch 1 ON      Bypasses error timeouts

OFF      Allows error timeouts

Switch 2 ON      Generates data for each sector

OFF      Saves data on disk pack

Switch 3 ON      Halts on error

OFF      Bypasses halt on error

Switch 4 ON      Loops test

OFF      Halts on test completion

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B. SETUP (cont.):

2. During the keying in of data, if the user makes an error typing in data on the console typewriter, he can turn console Switch 3 on, press release and start, turn Switch 3 off, and re-enter the data.

3. File Switches:

Write Address Switch -- ON

Compare Disable Switch -- ON (OUT)

4. Normal Setting of Console Switches

Program Switches -- As Desired

Data Switches -- Program

5. The user should insure that the PACK ON and READY lights on the Disk Storage Drive are ON.

6. Loading Program

- a. Clear core by inserting and executing 31 00003 00002

- b. Paper Tape Input

- (1) Load tape in reader.
- (2) Insert and execute 36 00000 00300.
- (3) After core has been loaded, depress START key.
- (4) Follow typed out instructions.

- c. Card Input

- (1) Place cards in reader hopper.
- (2) Place 1620 in manual mode.
- (3) Depress load key.
- (4) After core has been loaded, depress START key.
- (5) Follow typed out instructions.

Note: When using this test with the CE Disk Pack, yes must be keyed in in answer to the question "Are you using CE Disk Pack."

If no is keyed in, the head alignment data on cylinders 00, 34, 35, 36, and 99 will be destroyed.

C. DETAILED EXPLANATION:

This test is designed to write the indeleble addresses on 1311 disk packs with the option of either saving the data that is on the sectors or writing known data on the sectors. The test has been written in routine form, and groups of routines perform certain logical functions. The routines that perform logical functions are:

Control Routine

Seek Cylinder Routine

Write Addresses Routine

Check Addresses Written Routine

Test Complete Routine

Error Routine

The Control Routine is comprised of a group of routines. The name of the test, operating instructions, and switch functions are typed out by these routines. Input data required for the proper operation of this test is entered during the execution of the Control Routine. A check that the entered address is not on cylinders 35 or 36 is made; the disk unit drive code digit is generated from the module number entered; and the address of the first sector of the track is calculated. If known data is to be written on the sectors, this data is generated in the Control Routine.

The following input must be entered during the execution of the Control Routine: (See Note At Bottom of Page 2)

1. Yes or no, entered from the console typewriter.

Normally the answer to this question is YES; because the test is being used with the CE Disk Pack. Typing in YES provides for a program check to prevent writing on cylinders 00, 34, 35, 36, and 99. If NO is entered, no program check is made of the cylinders being written on and the head alignment data will be destroyed if used

C. DETAILED EXPLANATION (cont.):

- with the CE Disk Pack. A typeout occurs (DO NOT USE ON CE DISK PACK), if NO is entered to warn the user that all cylinders will be written on.
2. A one digit number, the module number of the Disk Storage drive on which the Disk Pack is located, is entered from the console typewriter.
3. A five digit sector address indicating the starting track on which addresses are to be written is entered from the console typewriter.
- To write all addresses, key in 00000. If YES was keyed in as the answer to whether or not the CE Disk Pack is being used, the sector address entered is checked that it is not on cylinders 35 or 36. If the entered address is on one of these cylinders, an error message will type out requesting that the address be entered again. A new address should be entered which is not on one of these cylinders.

The drive code digit must be calculated from the module number keyed in because of the format of the Disk Control Field. The calculation of the drive code gives the following results:

<u>Module No.</u>	<u>Drive Code</u>
0	1
1	3 -
2	5 -
3	7 -

This drive code is then set in the F<sub>0</sub> position of the Disk sub-instructions.

The starting address of the track containing the addresses entered is calculated. This is always an even digit in the tens position and zero in the units' position; i. e., XXXEO. If the tens' digit entered is even, it is the starting address, but if it is odd, the starting address is one less than the tens' digit entered.

C DETAILED EXPLANATION (cont.):

The status of program switch 2 determines whether the data on the sectors will be rewritten (switch 2 off) when the addresses are written or whether generated data will replace (switch 2 on) the previous data on the sectors. The routine to generate a track (2100 characters) of data is entered if switch 2 is on. A typical sector of the data generated is:

0000000000111111112222222222...88888888899999999999

The twenty, five digit address are inserted in their respective positions before the data is written on the disk pack.

Prior to giving the access mechanism a seek command to position at the proper cylinder for writing, a check is made as to whether the CE Disk Pack is being used or not (entered information). If the CE Disk is being used, a check is made to verify that cylinders 00, 34, or 99 are not being accessed. If the cylinder is 00, the address is updated to cylinder

01 and the test continues; if the cylinder is 34, the address is updated to cylinder 37 before programming is continued; and if the cylinder is 99, the program enters the test completed routine. If the CE Disk Pack is not being used, this routine is bypassed.

The Seek Cylinder Routine positions the access mechanism and then checks to see if a Select Lock condition exists.

The Write Address Routine checks program switch 2 to determine if the data on the Disk Pack is to be saved or not. If it is, a Read Disk Track Numerically without wrong length record check (RTN) is executed. The new (generated) disk addresses are placed in their proper positions in the data just read in, and then a Write Disk Track without wrong length Record Check (WTN) is executed. A check for parity errors is made after the RTN and WTN instructions.

The Check Addresses Written Routine makes a double check to insure that the addresses were written on the Disk Pack. The first check is the execution of a check Disk Track Numerically without wrong length record

C. DETAILED EXPLANATION (cont.):

check (CTN). The second check is a program compare of each of the addresses read from the Disk Pack. A RTN instruction compares the Disk Addresses against the addresses in the data used in the WTN instruction, Write Address routine. If both of these checks give positive indications, the addresses have been written on the Disk Pack. Error messages are typed out if the results are negative.

The Check Addresses Written Routine also contains a routine to determine if a complete cylinder has been written. If it has, updating is performed and the Seek Cylinder Routine is entered. A check is also made to determine if the entire Disk Pack has been written. When it has, the Test Completed routine is entered.

The Test Completed Routine checks if any errors occurred while the program was being run, if the error timeouts were bypassed, and then types out the appropriate message.

The Error Routine is entered whenever a Parity Check is detected or a program compare indicates an incorrect result. It contains the necessary instructions to control whether or not an error message will be typed out, whether or not the program will halt on an error, or whether or not the program will loop on an error.

D. ERROR ANALYSIS:

CANT USE CYLINDERS 00, 34, 35, 36, 99 ON CE DISK PACK

ERO 00930, 00954

This error type out will occur if the user keys in a sector address that is on cylinders 35 and 36, and he has the CE Disk Pack on the storage drive. The program will request the sector address again.

ERROR OCCURRED BUT SWITCH 1 WAS ON, THUS NO ETO

ER8O 02430

This error type out will occur in the test completed routine if the user has switch 1 ON and an error occurred during the

D. ERROR ANALYSIS (cont.):

running of the test. ETO = Error Type Out.

AAAAAAA BBBBB (XX) CYL ZZ HDY

All other error type outs follow this standard format.

AAAAAAA is the Disk Storage Command on which the error occurred. All disk operations in this program are without Wrong Length Record Check.

BBBBBB (XX) is the error that occurred and turned on ANY DATA check. (XX) is the indicator number.

CYL ZZ HDY gives the cylinder number ZZ (00-99) and the head Y90-9) addressed when the error occurred.

The AAAAAAAA type outs that can occur are:

READ TRACK A1 ER2 01530

The program is reading from a track on the Disk into area A1 in memory.

WRITE TRACK ER3 01710

The program is writing from area A1 in memory onto a track on the Disk Pack.

READ BK TK CK ER4 01782

The program is doing a read back track compare of the data written onto the Disk Pack out of area A1 in memory.

READ TRACK A2 ER5 01842

The program is reading the track written back into area A2 in memory.

PROG COMPARE ER6 01986

The program is doing a compare of the sector addresses written from area A1 and read back into area A2.

SEEK ER8 01458

The program has performed a seek operation.

D. ERROR ANALYSIS (cont.):  
BBBBBB (XX),

The BBBB type errors are:

ADS CK (36)	ER10	02574
WLR CK (37)	ER11	02694
OVFO CK (38)	ER12	02718
RD CK (06)	ER14	02754
WR CK (07)	ER15	02778
MBR-E (16)	ER16	02802
MBR-O (17)	ER17	02826
FILE NO IND (39)	ER13	02718

The program found Any File indicator on, but all the indicators which turn it on are off.

NOT/EQ ADS ER18 02010

The program during the compare of the sector address found one that was not equal. The program attempts to rewrite that track of addresses again.

SELECT LOCK ER19 02574  
CYL ZZ HD Y ER20 02934

This is the rest of the error type out that tells the user which cylinder (CYL) the error occurred on, where ZZ will be from 00 to 99, and also which head (HD) or track was in error, where Y will be from 0 to 9.

E. SERVICE HINTS:

1. The test also contains a routine that will loop on a write instruction (write disk track numerically without record length check). This routine has to be entered via execution of a branch instruction in the insert area (49 03114). This routine changes a no operation instruction to a branch and branches to the main program for the data as to which module number and sector address is to be used.

E. SERVICE HINTS (cont.):

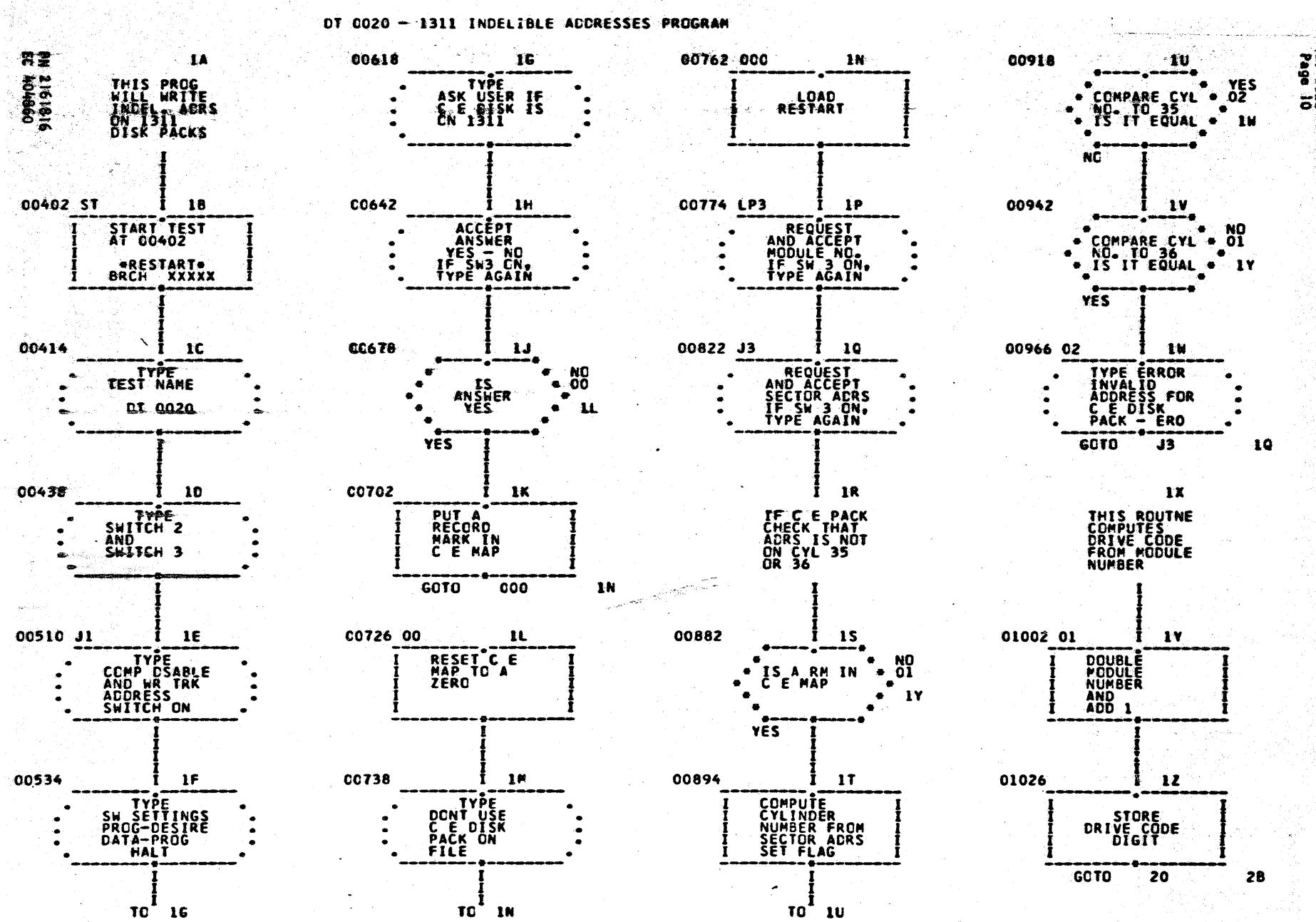
This is request from the user. The routine utilizes the write instruction in the main program. This write instruction is continually executed until the user turns console switch 4 off.

The routine then changes a branch to a "NOP", and branches to the test complete routine in the main program.

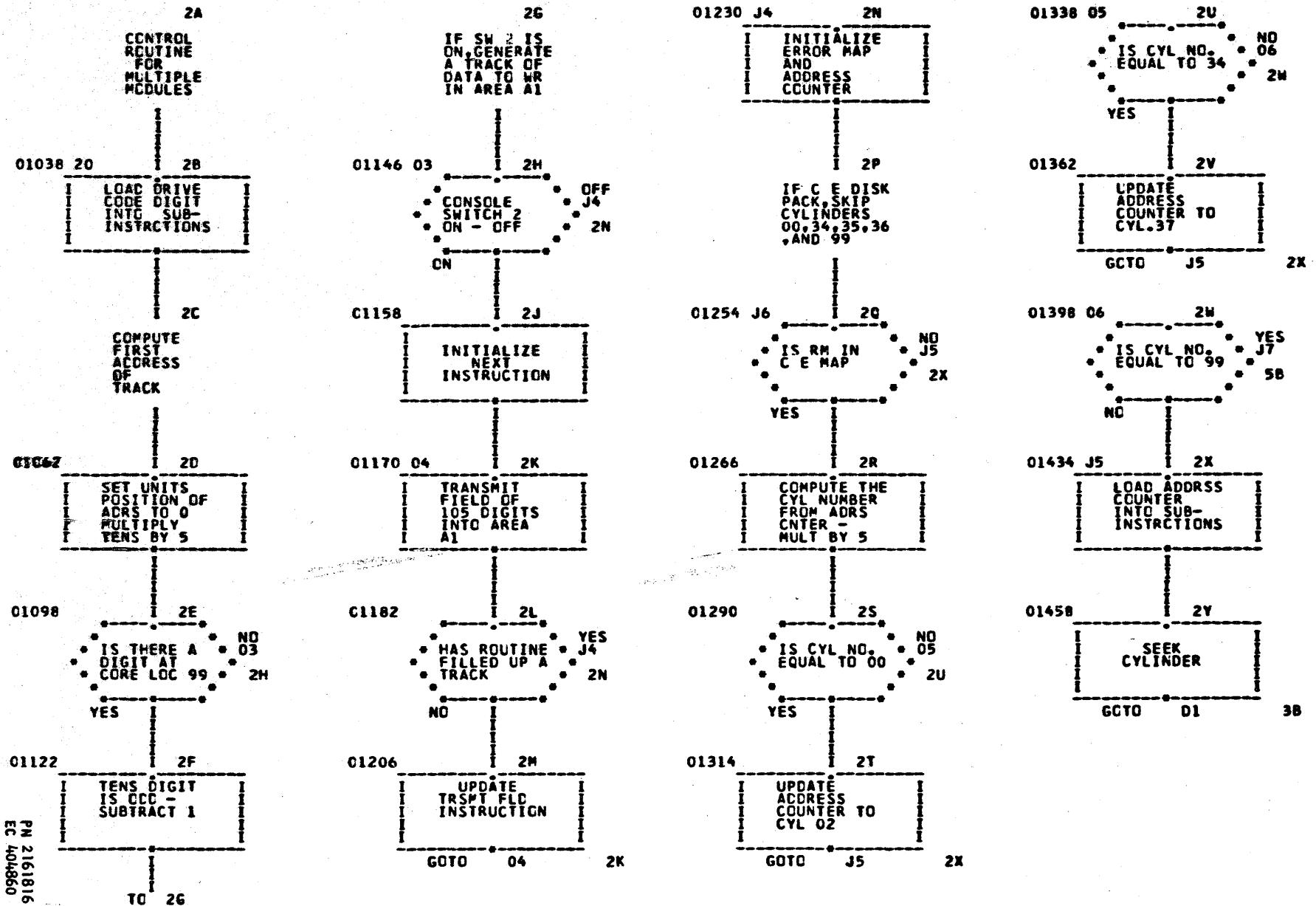
2. This program was designed to fulfill the need to write addresses on the 1311 Disk Pack. However, it can also serve two other functions:

a. It will detect bad spots on a Disk Pack if these interfere with the magnetic pattern on the disk. This is detected by parity errors during a Read Operation, should parity errors occur. The head and cylinder number associated with the error will be typed out with the error message. The user may then dump the data read onto the typewriter to determine, by examining the characters, which sector is bad. This is done by inserting and executing a 35 XXXXX 00100 where XXXXX is the core location of the data area in core. The XXXXX's can be determined by looking at the subinstruction of the Disk operation that error occurred on.

b. This program will write addresses on the Disk Pack beginning with the starting track address of the track on which the sector address keyed in is on. As a Seek operation is executed for each cylinder and as the operation progresses through higher consecutive cylinders until the addresses are written on cylinder 99, the user can watch the access arms to determine if the Seek operation is successfully seeking the cylinders (i. e., access arm will progressively reach farther into the Disk Pack).

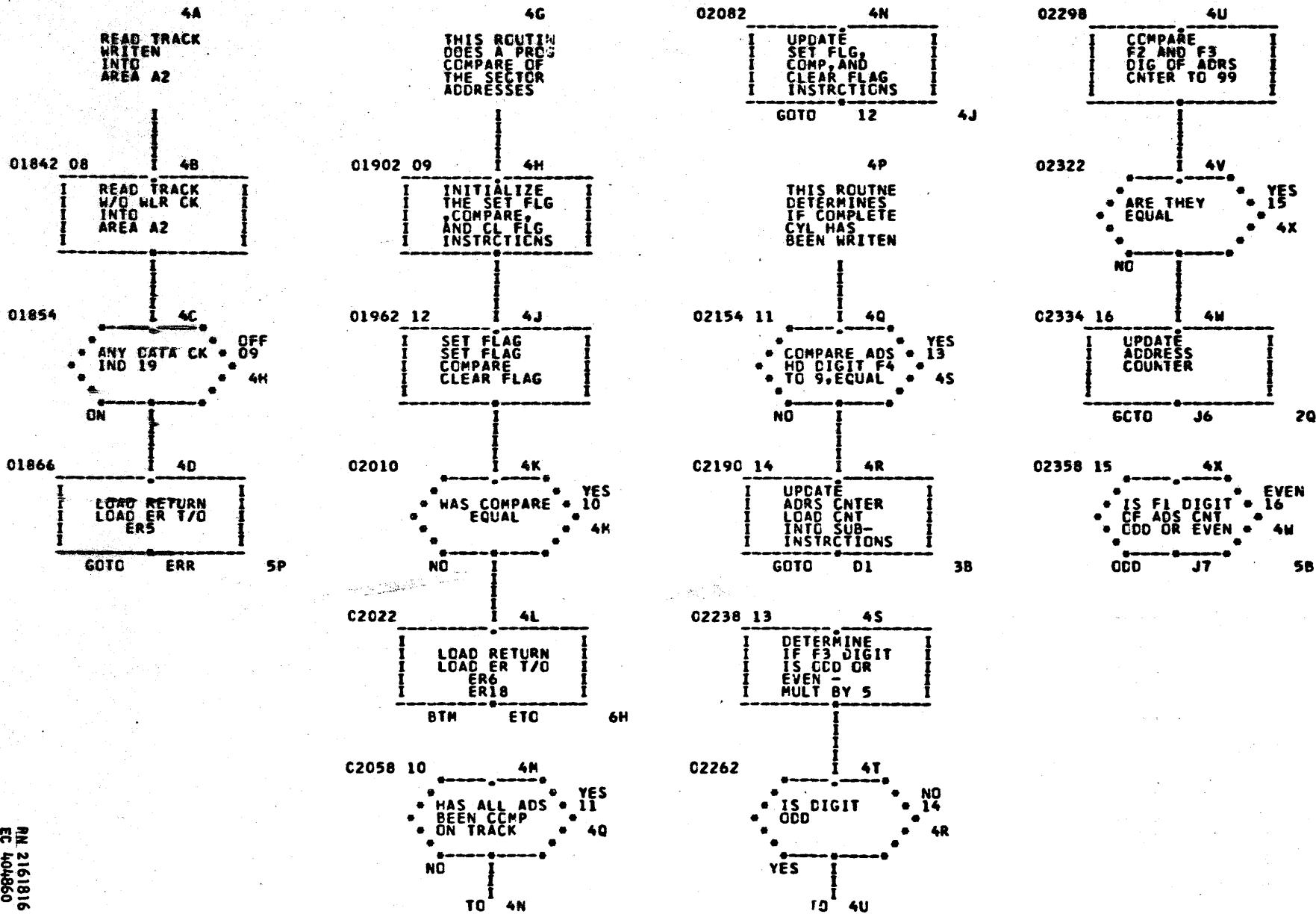


DT C020 - 1311 INDELIBLE ADDRESSES PROGRAM



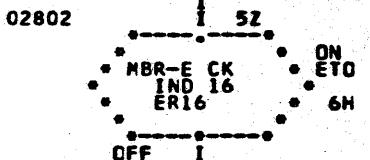
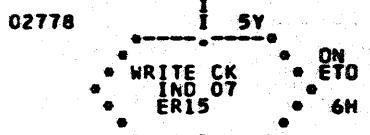
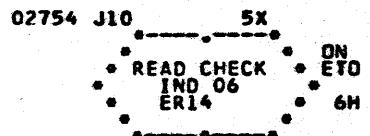
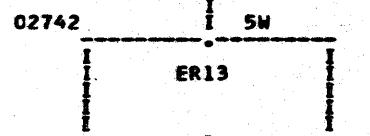
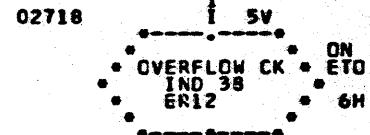
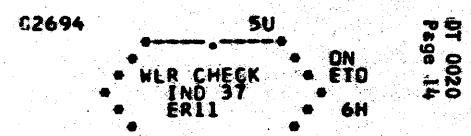
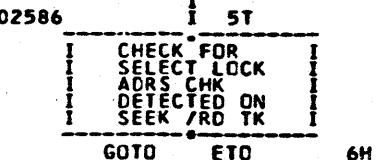
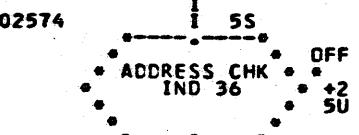
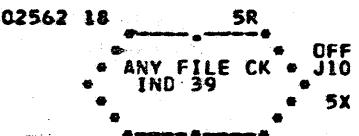
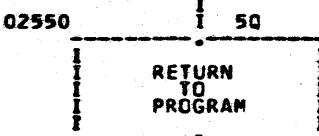
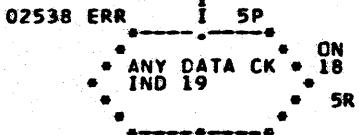
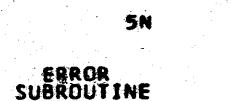
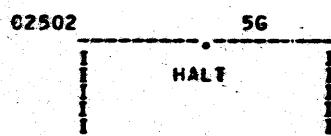
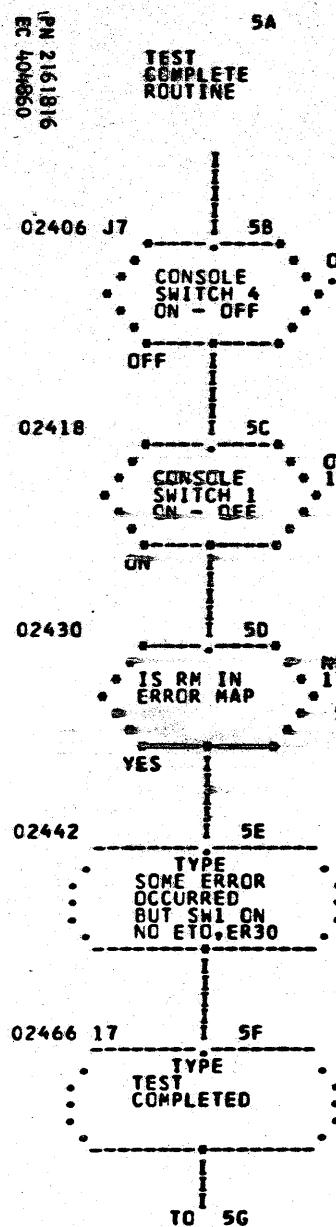


**DT C020 - 1311 INDELIBLE ADDRESSES PROGRAM**

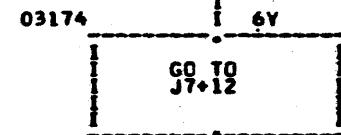
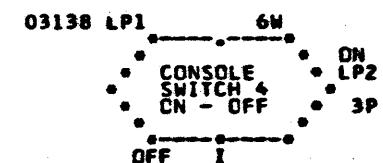
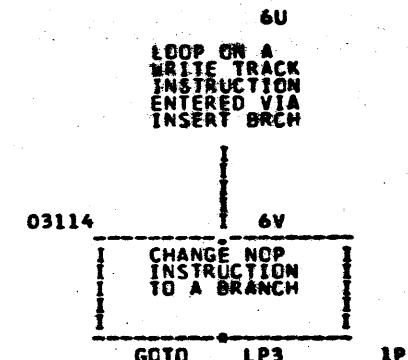
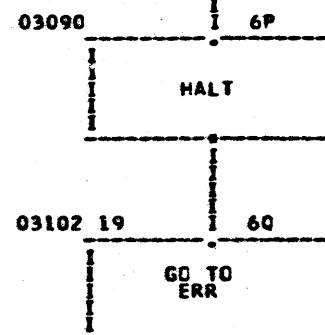
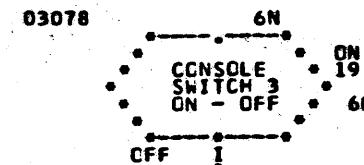
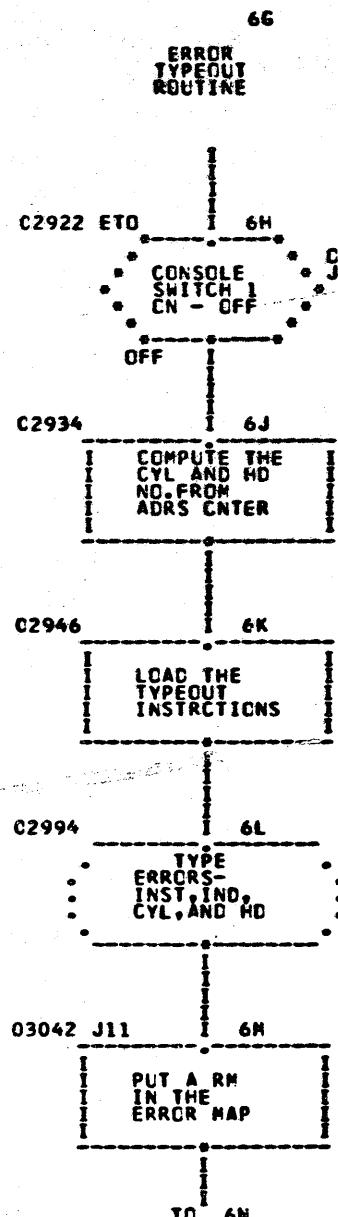
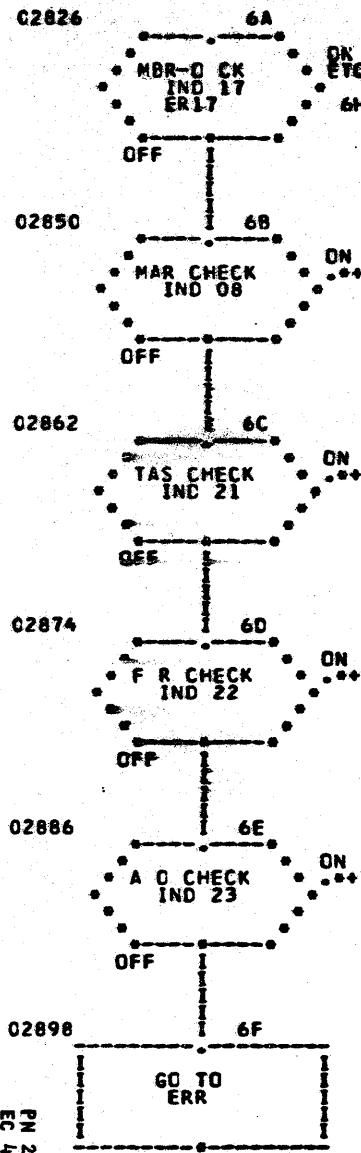


AN 2161816  
EC 404860

DT 0020 - 1311 INDELIBLE ADDRESSES PROGRAM



DT CC20 - 1311 INDELIBLE ADDRESSES PROGRAM



PN  
EC  
404860

SAMPLE OUTPUT FOR DT 0020

DT 0020 - INDELIBLE ADDRESSES PROGRAM  
SW 2 ON GENERATE WRITE DATA  
SW 2 OFF SAVES DATA  
SW 3 ON FOR CORRECTING KEY IN  
TURN ON THE COMPARE DISABLE (OUT) AND WRITE SECTOR ADDRESS SWITCHES  
SWITCH SETTINGS  
PROGRAM - AS DESIRED  
DATA—PROG  
ARE YOU USING CE DISK PACK, TYPE YES OR NO NO  
DO NOT USE ON CE DISK PACK  
KEY IN 1 DIGIT MODULE NUMBER 0  
KEY IN 5 DIGIT SECTOR ADDRESS 00000  
TEST COMPLETED

CORE LOC	INSTRUCTION	CARD NO.	LABEL, OPERATION OPERANDS AND REMARKS
		00010 **	
		00020 *	DT 0020 INDELIBLE ADRS PROG*
		00030 **	
		00040 *	THIS PROGRAM WILL WRITE*
		00050 *	INDELIBLE ADDRESSES ON THE*
		00060 *	1311 DISK STORAGE DRIVE*
		00070 *	DISK PACKS.*
		00080 **	
		00090 **	
		00100 *	CONTROL ROUTINE*
		00110 **	
00402		00120	DORG 00402... B *+12... DEFINE START*
00402 49 00414 00000		00130 ST	RCTY ... RESTART*
00414 34 00000 00102		00140	WATY T1... RETURN CARRIAGE*
00426 39 03187 00100		00150	TYPE TEST NAME*
		00160 **	
		00170 *	TYPE UUT SWITCH SETTINGS*
		00180 **	
00438 34 00000 00102		00190	RCTY ... WATY T31... RET CARR*
00450 39 03847 00100		00200	SW 2 SETTING*
00462 34 00000 00102		00210	RCTY ... RET CARR*
00474 39 03903 00100		00220	WATY T32... SW 2 SETTING*
00486 34 00000 00102		00230	RCTY ... RET CARR*
00498 39 03787 00100		00240	WATY T30... TYPE SW3 ON*
00510 34 00000 00102	J1	00250	RCTY ... RETURN CARRIAGE*
00522 39 03317 00100		00260	WATY T3... TYPE SWITCH ON*
00534 34 00000 00102		00270	RCTY ... RETURN CARRIAGE*
00546 39 03453 00100		00280	WATY T4... TYPE SW SETTING*
00558 34 00000 00102		00290	RCTY ... RETURN CARRIAGE*
00570 39 03485 00100		00300	WATY T5... TYPE SENSE--OFF*
00582 34 00000 00102		00310	RCTY ... RETURN CARRIAGE*
00594 39 03527 00100		00320	WATY T6... TYPE DATA--PROG*
00606 48 00000 00000		00330	H ... HALT*
		00340 **	
		00350 *	ASK IF C E DISK PACK*
		00360 **	
00618 34 00000 00102		00370	RCTY ... RETURN CARRIAGE*
00630 39 03671 00100		00380	WATY T9... ASKS IF CE PACK*

00642 37 04599 00100	00390	RATY C1,,,	ACCEPT ANSWER#
00654 46 00642 00300	00400	BC3 *-12,,,	SW3 ON TYP AGAIN#
00666 32 04598 00000	00410	SF C1-1,,,	SET FLAG#
00678 14 04599 00008	00420	CM C1,68,10,	IS ANSWER YES#
00690 47 00726 01200	00430	BNE *+36,,,	BRCH IF NOT#
00702 25 04624 04622	00440	TD CEM,RM,,	PUT RM IN MAP#
00714 49 00762 00000	00450	B *+48,,,	SKIP T/O#
00726 15 04624 00000	00460	TDM CEM,00000,,	RESET MAP#
00738 34 00000 00102	00470	RCTY ,,,	RETURN CARRIAGE#
00750 39 03263 00100	00480	WATY T2,,,	DONT USE CE PACK#
00762 16 00408 -0774	00490	TFM ST+6,*+12,,	LOAD RESTART#
	00500 *#		
	00510 *		REQUEST AND ACCEPT MODULE NO.#
	00520 *#		
00774 34 00000 00102	00530 LP3	RCTY ,,,	RETURN CARRIAGE#
00786 39 03549 00100	00540	WATY T7,,,	RQT MOD NO.#
00798 36 04607 00100	00550	RNTY N,,,	KEY IN NUMBER#
00810 46 00798 00300	00560	BC3 *-12,,,	SW3 ON TYP AGAIN#
	00570 *#		
	00580 *		REQUEST AND ACCEPT#
	00590 *		DESIRED SECTOR ADDRESS#
	00600 *#		
00822 34 00000 00102	00610 J3	RCTY ,,,	RETURN CARRIAGE#
00834 39 03609 00100	00620	WATY T8,,,	RQT ADDRESS#
00846 36 04614 00100	00630	RNTY A-4,,,	KEY IN ADDRESS#
00858 46 00846 00300	00640	BC3 *-12,,,	SW3 ON TYP AGAIN#
00870 32 04614 00000	00650	SF A-4,,,	SET FLG ON ADRS#
	00660 *#		
	00670 *		IF C E PACK,CHECK THAT ADS#
	00680 *		IS NOT ON CYLINDER 35 OR 36#
	00690 *#		
00882 45 01002 04624	00700	BNR *+120,CEM,,	IS RM IN CE MAP#
00894 13 04616 000-5	00710	MM A-2,05,10,	SET UP CYL NO.#
00906 32 00097 00000	00720	SF 97,,,	SET FLAG#
00918 14 00098 000L5	00730	CM 98,035,10,	IS IT CYL 35#
00930 46 00966 01200	00740	BE *+36,,,	BRCH IF SO#
00942 14 00098 000L6	00750	CM 98,036,10,	IS IT CYL 36#
00954 47 01002 01200	00760	BNE *+48,,,	BRCH IF NOT#

00966	34	00000	00102	00770	RCTY	•••	RETURN CARRIAGE*
00978	39	03943	00100	00780	WATY	ERO•••	TYPE ERROR*
00990	49	00822	00000	00790	B	J3•••	KEY IN AGAIN*
				00800 *#			
				00810 *			THIS ROUTINE COMPUTES DRIVE*
				00820 *			CODE DIGIT FROM MODULE NO.*
				00830 *#			
01002	13	04607	000-2	00840	MM	N,02,10,	MULTIPLY*
01014	11	00099	0-001	00850	AM	99,01,8,	ADD 1*
01026	25	04611	00099	00860	TD	M,99,,	RELOAD MOD NO.*
				00870 *#			
				00880 *			SUB-INSTRUCTION CONTROL*
				00890 *			ROUTINE FOR MULTIPLE MODULES*
				00900 *#			
01038	25	04638	04611	00910	J2		LOAD MOD NO.*
01050	25	04652	046II	00920	TD	S1,M,,	LOAD MOD NO.*
				00930 *#	TD	S2,M,,	LOAD MOD NO.*
				00940 *			
				00950 *			COMPUTE FIRST ADDRESS OF TRACK*
				00960 *#			AND STORE MATH TABLES*
01062	15	04618	00000	00970	TDM	A,0,,	SET UNITS TO 0*
01074	25	01097	04617	00980	TD	*+23,A-1,,	LOAD MULTIPLY*
01086	13	04635	000-0	00990	MM	C2,00,10,	MULTIPLY E/O*
01098	43	01122	00099	01000	BD	*+24,99,,	BRCH IF ODD*
01110	49	01134	00000	01010	B	*+24,,,	SKIP NEXT INST*
01122	12	04617	0-001	01020	SM	A-1,01,8,	SUBTRACT 1*
01134	31	04772	00100	01030	TR	TAB,00100,,	STORE MATH TABLES*
				01040 *#			
				01050 *			IF SW 2 IS ON, GENERATE A*
				01060 *			TRACK OF DATA TO WRITE ON*
				01070 *			DISK INTO AREA A1*
				01080 *#			
01146	47	01230	00200	01090	BNC2	J4,,,	SW 2 OFF BYPASS*
01158	16	01176	-5182	01100	TFM	*+18,A1+105,,	LOAD NEXT INST*
01170	26	99999	04770	01110	TF	99999,C3-1,,	PUT DATA IN A1*
01182	14	01176	-7177	01120	CM	*-6,A1+2100,,	SEE IF DONE*
01194	46	01230	01200	01130	BE	*+36,,,	BRCH IF DONE*
01206	11	01176	-0105	01140	AM	*-30,105,,	UPDATE INST*

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01218	49	01170	00000	01150
				01160 *#
				01170 *
				01180 *
				01190 *#
01230	15	04626	00000	01200 J4
01242	26	04631	04618	01210
				01220 *#
				01230 *
				01240 *
				01250 *#
01254	45	01434	04624	01260 J6
01266	13	04629	000-5	01270
01278	32	00097	00000	01280
01290	14	00098	000-0	01290
01302	47	01338	01200	01300
01314	15	04629	00002	01310
01326	49	01434	00000	01320
01338	14	00098	000L4	01330
01350	47	01398	01200	01340
01362	15	04628	00007	01350
01374	15	04629	00004	01360
01386	49	01434	00000	01370
01398	14	00098	000R9	01380
01410	47	01434	01200	01390
01422	49	02406	00000	01400
01434	26	04643	04631	01410 J5
01446	26	04657	04631	01420
				01430 *#
				01440 *
				01450 *#
01458	34	04638	00701	01460
01470	47	01518	01900	01470
01482	16	02556	-1458	01480
01494	16	03012	-4189	01490
01506	49	02538	00000	01500
				01510 *#
				01520 *

B	*-48,,,	LOOP BACK*
INITIALIZATION ROUTINE*		
FOR ADDRESS COUNTER AND MAPS*		
TDM	ERM,00,,	RESET ERROR MAP*
TF	ADS,A,,	LOAD ADDRESS CNT*
IF C E DISK PACK, SKIP*		
CYLINDERS 00,34,35,36,99*		
BNR	J5,CEM,,	CK FOR RM*
MM	ADS-2,05,10,	COMPUTE CYL NO.*
SF	97,,,	SET FLAG*
CM	98,00,10,	IS NO. EQ TO 00*
BNE	*+36,,,	BRCH IF NOT*
TDM	ADS-2,02,,	UPDATE CYLINDER*
B	J5,,,	COMPLT INIT*
CM	98,34,10,	IS NO. EQ TO 34*
BNE	*+48,,,	BRCH IF NOT*
TDM	ADS-3,07,,	UPDATE CYL*
TDM	ADS-2,04,,	UPDATE CYL*
B	J5,,,	COMPLT INIT*
CM	98,99,10,,	IS NO. EQ TO 99*
BNE	J5,,,	BRCH IF NOT*
B	J7,,,	DONE*
TF	S1+5,ADS,,	LOAD SUB-INST 1*
TF	S2+5,ADS,,	LOAD SUB-INST 2*
SEEK CYLINDER*		
K	S1,701,,	SEEK DESIRED CYL*
BNI	*+48,01900,,	ANY DATA CHECK*
TFM	ERR+18,*-24,,	LOAD RETURN*
TFM	E1+6,ER8,,	LOAD OPERATION*
B	ERR,,,	BRCH TO ER ROUT*
IF SW 2 OFF SAVE DATA ON DISK*		

01518 46 01590 00200	01530 **	01540 01	BC2 J8,,,	SW 2 ON BYPASS#
01530 36 04638 00706	01550		RN S1,0706,,	RD TK W/O RLC#
01542 47 01590 01900	01560		BNI *+48,01900,,	ANY DATA CHECK#
01554 16 02556 -1530	01570		TFM ERR+18,-24,,	LOAD RETURN#
01566 16 03012 -4045	01580		TFM E1+6,ER2,,	LOAD ERROR T/D#
01578 49 02538 00000	01590		B ERR,,,	BRCH TO ER ROUT#
	01600 **			
	01610 *			PLACE NEW SECTOR ADDRESSES#
	01620 *			IN WRITE DATA THAT WILL#
	01630 *			BE WRITTEN ON DISK PACK#
	01640 **			
01590 16 01620 -5082	01650 J8		TFM J9+6,A1+5,,	INIT TRSMT FLD#
01602 16 01632 -5078	01660		TFM J9+18,A1+1,,	INIT CL FLG INST#
01614 26 99999 04631	01670 J9		TF 99999,ADS,,	PUT ADS IN A1#
01626 33 99999 00000	01680		CF 99999,,,	CLEAR FLAG#
01638 14 01620 -7077	01690		CM J9+3,A1+2000,,	SEE IF DONE#
01650 46 01710 01200	01700		BE *+60,,,	BRCH IF DONE#
01662 11 01620 -0105	01710		AM J9+6,105,,	UPDATE TF#
01674 11 01632 -0105	01720		AM J9+18,105,,	UPDATE CF#
01686 11 04631 -0001	01730		AM ADS,01,,	UPDATE ADDRESS#
01698 49 01614 00000	01740		B J9,,,	LOOP BACK#
	01750 **			
	01760 *			WRITE DATA AND ADDRESSES#
	01770 *			BACK ONTO DISK PACK#
	01780 **			
01710 38 04638 00706	01790 LP2		WN S1,0706,,	WRITE TK W/O RLC#
01722 47 01770 01900	01800		BNI *+48,01900,,	ANY DATA CHECK#
01734 16 02556 -1710	01810		TFM ERR+18,-24,,	LOAD RETURN#
01746 16 03012 -4075	01820		TFM E1+6,ER3,,	LOAD ERROR T/D#
01758 49 02538 00000	01830		B ERR,,,	BRCH TO ER ROUT#
01770 41 03138 00000	01840 NOP		NOP LP1,,,	NOP FOR LP ROUT#
	01850 **			
	01860 *			DO A READ BACK CK OF DATA#
	01870 *			WRITTEN ONTO DISK PACK#
	01880 **			
01782 36 04638 00707	01890		RN S1,0707,,	COMP DATA,ADDRS#
01794 47 01842 01900	01900		BNI *+48,01900,,	ANY DATA CHECK#

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01806 16 02556 -1782	01910	TFM	ERR+18,-24,,	LOAD RETURN#
01818 16 03012 -4101	01920	TFM	E1+6,ER4,,	LOAD ERROR T/O#
01830 49 02538 00000	01930	B	ERR,,,	BRCH TO ER ROUT#
	01940 **			
	01950 *			
	01960 **			
01842 36 04652 00706	01970	RN	S2,0706,,	RD TK W/O RLC#
01854 47 01902 01900	01980	BNI	*+48,01900,,	ANY DATA CHECK#
01866 16 02556 -1842	01990	TFM	ERR+18,-24,,	LOAD RETURN#
01878 16 03012 -4131	02000	TFM	E1+6,ER5,,	LOAD ERROR T/O#
01890 49 02538 00000	02010	B	ERR,,,	BRCH TO ER ROUT#
	02020 **			
	02030 *			
	02040 *			
	02050 *			
	02060 **			
01902 16 01968 -5078	02070	TFM	D-18,A1+1,,	INITIALIZE#
01914 16 01980 -7180	02080	TFM	D-6,A2+1,,	INITIALIZE#
01926 16 01992 -5082	02090	TFM	D+6,A1+5,,	INITIALIZE#
01938 16 01997 -7184	02100	TFM	D+11,A2+5,,	INITIALIZE#
01950 16 02004 -5078	02110	TFM	D+18,A1+1,,	INITIALIZE#
01962 32 99999 00000	02120	SF	99999,,,	SET FLAG#
01974 32 99999 00000	02130	SF	99999,,,	SET FLAG#
01986 24 99999 99999	02140 D	C	99999,99999,,,	COMPARE ADDRESS#
01998 33 99999 00000	02150	CF	99999,,,	CLEAR FLAG#
02010 46 02058 01200	02160	BE	*+48,,,	BRCH OKAY#
02022 16 02556 -1710	02170	TFM	ERR+18,LP2,,	LOAD RETURN#
02034 16 03012 -4161	02180	TFM	E1+6,ER6,,	LOAD ER T/O#
02046 17 02922 -4429	02190	BTM	ETO,ER18,,	BRCH,LOAD ER T/O#
02058 14 01992 -7077	02200	CM	D+6,A1+2000,,	SEE IF DONE#
02070 46 02154 01200	02210	BE	*+84,,,	BRCH IF DONE#
02082 11 01968 -0105	02220	AM	D-18,105,,	UPDATE#
02094 11 01980 -0105	02230	AM	D-6,105,,	UPDATE#
02106 11 01992 -0105	02240	AM	D+6,105,,	UPDATE#
02118 11 01997 -0105	02250	AM	D+11,105,,	UPDATE#
02130 11 02004 -0105	02260	AM	D+18,105,,	UPDATE#
02142 49 01962 00000	02270	B	D-24,,,	LOOP BACK#
	02280 **			

	02290 *	THIS ROUTINE DETERMINES IF*
	02300 *	A COMPLETE CYLINDER HAS*
	02310 *	BEEN WRITTEN*
	02320 **	
02154 25 02177 04630	02330	TD *+23,ADS-1,, LOAD COMPARE*
02166 14 04633 000-0	02340	CM C4,00000,10, COMPARE HD TO 9*
02178 46 02238 01200	02350	BE *+60,,, BRCH IF EQUAL*
02190 11 04631 -0001	02360	AM ADS,01,, UPDATE ADS CNT*
02202 26 04643 04631	02370	TF S1+5,ADS,, LOAD SUB-INST 1*
02214 26 04657 04631	02380	TF S2+5,ADS,, LOAD SUB-INST 2*
02226 49 01518 00000	02390	B D1,,, LOOP BACK*
02238 25 02261 04629	02400	TD *+23,ADS-2,, LOAD MULTIPLY*
02250 13 04635 000-0	02410	MM C2,00000,10, MULTIPLY*
02262 43 02286 00099	02420	BD *+24,99,, BRCH IF ODD*
02274 49 02190 00000	02430	B *-84,,, SET UP NEXT TK*
02286 32 04628 00000	02440	SF ADS-3,,, SET FLAG*
02298 14 04629 000R9	02450	CM ADS-2,099,10, COMPARE TO 99*
02310 33 04628 00000	02460	CF ADS-3,,, CLEAR FLAG*
02322 46 02358 01200	02470	BE *+36,,, BRCH IF EQUAL*
<del>02334</del> 11 04631 -0001	02480	AM ADS,01,, UPDATE ADS CNT*
02346 49 01254 00000	02490	B J6,,, LOOP BACK*
02358 25 02381 04627	02500	TD *+23,ADS-4,, LOAD MULTIPLY*
02370 13 04635 000-0	02510	MM C2,00000,10, MULTIPLY*
02382 43 02406 00099	02520	BD *+24,99,, BRCH IF ODD*
02394 49 02334 00000	02530	B *-60,,, SET UP NEXT CYL*
	02540 **	
	02550 *	
	02560 *	
02406 46 01242 00400	02570 J7	TEST COMPLETE ROUTINES*
02418 47 02466 00100	02580	{
02430 45 02466 04626	02590	BC4 J6-12,,, SW 4 ON LOOP BK*
02442 34 00000 00102	02600	BNC1 *+48,,, SW 1 OFF BYPASS*
02454 39 04511 00100	02610	BNR *+36,ERM,, CK FOR RM IN MAP*
02466 34 00000 00102	02620	RCTY,,, RETURN CARRIAGE*
02478 39 03757 00100	02630	WATY ER30,,, TYPE ER OCCURRED*
02490 34 00000 00102	02640	RCTY,,, RETURN CARRIAGE*
02502 48 00000 00000	02650	WATY T10,,, TEST COMPLETED*
02514 16 00408 -0414	02660	RCTY,,, RETURN CARRIAGE*
		H,,, HALT*
		TFM ST+6,ST+12,, RESTART*

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			B	ST...	RESTART TEST#
02526	49	00402	00000	02670	
				02680	*#
				02690	*
				02700	**
02538	46	02562	01900	02710	ERR
02550	49	99999	00000	02720	
02562	47	02754	03900	02730	
02574	47	02694	03600	02740	
02586	14	03012	-4189	02750	
02598	46	02658	01200	02760	
02610	14	03012	-4045	02770	
02622	46	02658	01200	02780	
02634	14	03012	-4131	02790	
02646	47	02682	01200	02800	
02658	16	03007	000ML	02810	
02670	17	02922	-4455	02820	
02682	17	02922	-4201	02830	
02694	47	02718	03700	02840	BYSL
02706	17	02922	-4229	02850	
02718	47	02742	03800	02860	
02730	17	02922	-4257	02870	
02742	17	02922	-4287	02880	
02754	47	02778	00600	02890	J10
02766	17	02922	-4325	02900	
02778	47	02802	00700	02910	
02790	17	02922	-4351	02920	
02802	47	02826	01600	02930	
02814	17	02922	-4377	02940	
02826	47	02850	01700	02950	
02838	17	02922	-4403	02960	
02850	46	02862	00800	02970	
02862	46	02874	02100	02980	
02874	46	02886	02200	02990	
02886	46	02898	02300	03000	
02898	49	02538	00000	03010	
			03020		**
			03030		*
			03040		**
					ERROR SUBROUTINE#
					RESTART TEST#
					ERROR TYPE OUT ROUTINE#

02910	41	00000	00000	03050		NOP	,,	NO OPERATION*
02922	46	03042	00100	03060	ETO	BC1	J11,,,	SW 1 ON BYPASS*
02934	13	04631	000-5	03070		MM	ADS,05,10,,	MULTIPLY*
02946	25	04493	00095	03080		TD	ER20+10,95,,	CYL. NUMBER*
02958	25	04495	00096	03090		TD	ER20+12,96,,	CYL. NUMBER*
02970	25	04507	00097	03100		TD	ER20+24,97,,	HD NUMBER*
02982	26	03024	02921	03110		TF	E1+18,ETO-1,,	LOAD ER T/O*
02994	34	00000	00102	03120		RCTY	,,	RETURN CARRIAGE*
03006	39	99999	00100	03130	E1	WATY	99999,,,	TYPE ERROR*
03018	39	99999	00100	03140		WATY	99999,,,	TYPE ERROR*
03030	39	04483	00100	03150		WATY	ER20,,,	TYPE ERROR*
03042	25	04626	04622	03160	J11	TD	ERM,RM,,	PUT RM IN MAP*
03054	31	00100	04772	03170		TR	00100,TAB,,	REPLACE MATH TAB*
03066	16	03007	000L9	03180		TFM	E1+1,39,10,,	CHNG NOP TO WATY*
03078	47	03102	00300	03190		BNC3	*+24,,,	SW 3 ON HALT*
03090	48	00000	00000	03200		H	,,,	HALT*
03102	49	02538	00000	03210		S	ERR,,,	SEE IF MORE ERS*
				03220	*			
				03230	*			
				03240	*			
				03250	*			
				03260	*			
03114	15	01771	00009	03270		TDM	NOP+1,09,,	CHANGE NOP TO B*
03126	49	00774	00000	03280		B	LP3,,,	BRCH TO MAINLINE*
03138	46	01710	00400	03290	LP1	BC4	LP2,,,	LOOP BK TO WRITE*
03150	15	01771	00001	03300		TDM	NOP+1,01,,	CHANGE B TO NOP*
03162	16	00408	-0414	03310		TFM	ST+6,ST+12,,	LOAD RESTART*
03174	49	02418	00000	03320		B	J7+12,,,	BRCH TO TST DNE*
				03330	*			
				03340	*			
				03350	*			
				03360	*			
03187		00019		03370	T1	DAC	19,DT 0020 - INDELIBLE*	
03225		00019		03380		DAC	19, ADDRESSES PROGRAM*	
03263		00027		03390	T2	DAC	27,DO NOT USE ON CE DISK PACK*	
03317		00023		03400	T3	DAC	23,TURN ON THE COMPARE DIS*	
03363		00024		03410		DAC	24,ABLE (OUT) AND WRITE SEC*	
03411		00021		03420		DAC	21,TOR ADDRESS SWITCHES*	

LOOP ON A WRITE INSTRUCTION\*  
ENTERED VIA A BRANCH IN\*  
THE INSERTION AREA\*

DATA, TYPE OUTS, ERROR\*  
MESSAGES AND CONSTANTS\*

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03453 00016 03430 T4 DAC 16,SWITCH SETTINGS\*#  
03485 00021 03440 T5 DAC 21,PROGRAM - AS DESIRED\*#  
03527 00011 03450 T6 DAC 11,DATA--PROG\*#  
03549 00025 03460 T7 DAC 25,KEY IN 1 DIGIT MODULE NUM\*#  
03599 00005 03470 DAC 05,BER \*#  
03609 00025 03480 T8 DAC 25,KEY IN 5 DIGIT SECTOR ADD\*#  
03659 00006 03490 DAC 06,RESS \*#  
03671 00021 03500 T9 DAC 21,ARE YOU USING CE DISK\*#  
03713 00022 03510 DAC 22, PACK,TYPE YES OR NO \*#  
03757 00015 03520 T10 DAC 15,TEST COMPLETED\*#  
03787 00022 03530 T30 DAC 22,SW 3 ON FOR CORRECTING\*#  
03831 00008 03540 DAC 08, KEY IN\*#  
03847 00028 03550 T31 DAC 28,SW 2 ON GENERATE WRITE DATA\*#  
03903 00020 03560 T32 DAC 20,SW 2 OFF SAVES DATA\*#  
03570 \*#  
03580 \*#  
03590 \*#

ERROR MESSAGES\*

03943 00027 03600 ERO DAC 27,CANT USE CYLINDERS 00,34,35\*#  
03997 00024 03610 DAC 24,,36,99 ON C E DISK PACK\*#  
04045 00015 03620 ER2 DAC 15,READ TRACK A1 \*#  
04075 00013 03630 ER3 DAC 13,WRITE TRACK \*#  
04101 00015 03640 ER4 DAC 15,READ BK.TK.CK \*#  
04131 00015 03650 ER5 DAC 15,READ TRACK A2 \*#  
04161 00014 03660 ER6 DAC 14,PROG COMPARE \*#  
04189 00006 03670 ER8 DAC 06,SEEK \*#  
04201 00014 03680 ER10 DAC 14, ADS CK (36) \*#  
04229 00014 03690 ER11 DAC 14, WLR CK (37) \*#  
04257 00015 03700 ER12 DAC 15, OVFO CK (38) \*#  
04287 00019 03710 ER13 DAC 19, FILE NO IND (39) \*#  
04325 00013 03720 ER14 DAC 13, RD CK (06) \*#  
04351 00013 03730 ER15 DAC 13, WR CK (07) \*#  
04377 00013 03740 ER16 DAC 13, MBR-E (16) \*#  
04403 00013 03750 ER17 DAC 13, MBR-O (17) \*#  
04429 00013 03760 ER18 DAC 13, NOT/EQ ADS \*#  
04455 00014 03770 ER19 DAC 14,SELECT LOCK \*#  
04483 00014 03780 ER20 DAC 14, CYL 99 HD 9\*#  
04511 00023 03790 ER30 DAC 23,ERROR OCCURRED BUT SW 1\*#  
04557 00021 03800 DAC 21, WAS ON THUS NO ETO.\*#

03810 \*\*  
 03820 \* DATA, CONSTANTS, WORKING\*  
 03830 \* AREA AND SUB-INSTRUCTIONS\*  
 03840 \*\*

04599	00003	03850 C1	DAC	03,999.,,	ANSWER*
04605	00002	03860	DC	2,00.,,	BUFFER*
04607	00002	03870 N	DC	2,00.,,	MODULE*
04609	00002	03880	DC	2,00.,,	BUFFER*
04611	00002	03890 M	DC	2,00.,,	MODULE*
04613	00002	03900	DC	2,00.,,	BUFFER*
04618	00005	03910 A	DC	5,00000.,,	ADDRESS*
04620	00002	03920	DC	2,00.,,	BUFFER*
04622	00002	03930 RM	DC	2,0.,,	RECORD MARK*
04624	00002	03940 CEM	DC	2,00.,,	C E MAP*
04626	00002	03950 ERM	DC	2,00.,,	ERROR MAP*
04631	00005	03960 ADS	DC	5,00000.,,	ADDRESS CNTR*
04633	00002	03970 C4	DC	2,09.,,	CONSTANT 9*
04635	00002	03980 C2	DC	2,05.,,	CONSTANT 5*
04637	00001	03990	DAC	1,0.,*	
04638	00009	04000 S1	DSC	9,000000020.,,	SUB-INSTRUCTION*
04651	00005 -5078	04010	DSA	A1+1*	
04652	00009	04020 S2	DSC	9,000000020.,,	SUB-INSTRUCTION*
04665	00005 -7180	04030	DSA	A2+1*	
04670	00005	04040	DC	5,00000.,,	CONST*
04671	00020	04050	DSC	20,00000000001111111111,,	CONST*
04691	00020	04060	DSC	20,2222222233333333,,	CONST*
04711	00020	04070	DSC	20,444444444455555555,,	CONST*
04731	00020	04080	DSC	20,666666666677777777,,	CONST*
04751	00020	04090	DSC	20,888888888899999999,,	CONST*
04771	00001	04100 C3	DC	1,0.,,	LABEL FOR CONST*
04772	00002	04110 TAB	DSC	2,0*	
04873	00100	04120	DSB	100,3.,,	MATH TABLES*
05075	00001	04130	DAC	1,0*	
05077	00002	04140 A1	DC	2,00.,,	RD/WR AREA A1*
05182	00105	04150	DSB	105,20.,,	2100 POSITIONS*
07179	00002	04160 A2	DC	2,00.,,	RD/WR AREA A2*
07284	00105	04170	DSB	105,20.,,	2100 POSITIONS*
09280	00001	04180 A3	DC	1,0.,,	LAST LABEL*

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360007200500360020100500440001200276260005900274250001100000260009000269000-0000  
26000950026431000000020026001140027425000000001149000120000000000000000000-0001  
490041400000340000000102390318700100340000000102390384700100±0-1-0402-0462 -0002  
340000000102390390300100340000000102390378700100340000000102±0-1-0462-0522 -0003  
390331700100340000000102390345300100340000000102390348500100±0-1-0522-0582 -0004  
34000000010239035270010048000000000340000000102390367100100±0-1-0582-0642 -0005  
370459900100460064200300320459800000140459900008470072601200±0-1-0642-0702 -0006  
25046240462249007620000150462400000340000000102390326300100±0-1-0702-0762 -0007  
1600408-0774340000000102390354900100360460700100460079800300±0-1-0762-0822 -0008  
340000000102390360900100360461400100460084600300320461400000±0-1-0822-0882 -0009  
4501002046241304616000-53200097000001400098000L5460096601200±0-1-0882-0942 -0010  
1400098000L6470100201200340000000102390394300100490082200000±0-1-0942-1002 -0011  
1304607000-211000990-001250461100099250463804611250465204611±0-1-1002-1062 -0012  
1504618000002501097046171304635000-0430112200099490113400000±0-1-1062-1122 -0013  
12046170-0013104772001004701230002001601176-5182269999904770±0-1-1122-1182 -0014  
1401176-71774601230012001101176-0105490117000000150462600000±0-1-1182-1242 -0015  
2604631046184501434046241304629000-53200097000001400098000-0±0-1-1242-1302 -0016  
4701338012001504629000024901434000001400098000L4470139801200±0-1-1302-1362 -0017  
1504628000071504629000044901434000001400098000R9470143401200±0-1-1362-1422 -0018  
490240600000260464304631260465704631340463800701470151801900±0-1-1422-1482 -0019  
1602556-14581603012-4189490253800000460159000200360463800706±0-1-1482-1542 -0020  
4701590019001602556-15301603012-40454902538000001601620-5082±0-1-1542-1602 -0021  
1601632-50782699999046313399999000001401620-7077460171001200±0-1-1602-1662 -0022  
1101620-01051101632-01051104631-0001490161400000380463800706±0-1-1662-1722 -0023  
4701770019001602556-17101603012-4075490253800000410313800000±0-1-1722-1782 -0024  
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